

WHAT IS CLAIMED IS:

1. A method of forming a semiconductor device, comprising:

forming a body region of a semiconductor substrate;

5 forming a drift region adjacent at least a portion of the body region, using a dopant;

10 forming a field oxide structure adjacent a portion of the drift region and a portion of a drain region, wherein the field oxide structure is located between a gate electrode region and the drain region and is spaced apart from the gate electrode region;

15 wherein atoms of the dopant accumulate adjacent a portion of the field oxide structure forming an intermediate-doped region adjacent a portion of the field oxide structure;

20 forming a gate oxide adjacent a portion of the body region; and

forming a gate electrode adjacent a portion of the gate oxide.

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2. The method of Claim 1, wherein the dopant comprises phosphorous.

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3. The method of Claim 1, wherein the intermediate-doped region has a higher doping concentration than a doping concentration of the drift region.

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4. The method of Claim 1, further comprising forming a drain implant at the drain region, the drain implant having a higher doping concentration than a doping concentration of the intermediate-doped region.

5. The method of Claim 1, further comprising forming a buried layer of the semiconductor substrate, wherein the buried layer is adjacent a portion of the body region.

6. The method of Claim 1, further comprising forming a local oxidation on silicon (LOCOS) isolation structure adjacent a portion of the drain region.

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7. The method of Claim 5, wherein the LOCOS isolation structure is formed at approximately the same time as the field oxide structure.

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8. The method of Claim 1, further comprising forming a spacer structure adjacent a portion of the gate electrode.

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9. The method of Claim 1, further comprising forming a drain contact at the drain region, the drain contact operable to facilitate a flow of electric current through the semiconductor device.

10. A semiconductor device, comprising:
a body region of a semiconductor substrate;
a drift region adjacent at least a portion of the
body region, the drift region comprising a dopant;
5 a field oxide structure adjacent a portion of the
drift region and a portion of a drain region, wherein the
field oxide structure is located between a gate electrode
region and the drain region and is spaced apart from the
gate electrode region;
- 10 an intermediate-doped region adjacent a portion of
the field oxide structure, the intermediate-doped region
comprising dopant atoms accumulated proximate the field
oxide structure;
- 15 a gate oxide adjacent a portion of the body region;
and
a gate electrode adjacent a portion of the gate
oxide.
- 20 11. The semiconductor device of Claim 10, wherein
the dopant comprises phosphorous.
- 25 12. The semiconductor device of Claim 10, wherein
the intermediate-doped region has a higher doping
concentration than a doping concentration of the drift
region.
- 30 13. The semiconductor device of Claim 10, further
comprising a drain implant at the drain region, the drain
implant having a higher doping concentration than a
doping concentration of the intermediate-doped region.

14. The semiconductor device of Claim 10, further comprising a buried layer of the semiconductor substrate, wherein the buried layer is adjacent a portion of the body region.

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15. The semiconductor device of Claim 10, further comprising a local oxidation on silicon (LOCOS) isolation structure adjacent a portion of the drain region.

10 16. The semiconductor device of Claim 10, further comprising a spacer structure adjacent a portion of the gate electrode.

15 17. The semiconductor device of Claim 10, further comprising a drain contact at the drain region, the drain contact operable to facilitate a flow of electric current through the semiconductor device.

20 18. The semiconductor device of Claim 10, wherein a relationship between a doping concentration of the semiconductor device and a lateral distance from the drift region is generally linear.